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When Does Rent-Seeking Augment the Benefits of Price and Trade Reform on Rationed Commodities?

Estimates for Automobiles and Color Televisions in Poland

David Tarr

Price controls result in rents and in rent-seeking. Where the rent-seeking dissipates the rents, the costs of the price controls are magnified enormously above the traditional resource misallocation costs. But there are cases where rent-seeking does not dissipate the rents.

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This paper is a joint product of the Trade Policy Division, Country Economics Department and the Trade, Finance, and Public Sector Division, Technical Department, Europe, Middle East, and North Africa Regional Office. It is part of a larger Bank effort to assess the impact of price and trade reform on the reforming socialist economies of Eastern and Central Europe. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Dawn Ballantyne, room N10-033, extension 37947 (52 pages).

In January 1990, Poland embarked on a "Big Bang" approach to economic reform that in addition to macroeconomic reform decontrolled virtually all prices and devalued the Polish zloty. These two reforms eliminated virtually overnight massive excess demand for many Polish commodities and allowed the authorities to make the zloty internally convertible.

To assess the impact of these reforms on the Polish market for autos and color televisions, Tarr develops a differentiated product model, in which consumers maximize utility and firms maximize profits subject to rationing constraints and price controls.

Color televisions were rationed by queueing. Tarr finds that wasteful rent dissipation in color televisions exactly offset the rents because queues formed that dissipated the rents. Rent dissipation was roughly 10 times the traditional triangle of Harberger resource misallocation costs — so the benefit of price decontrol which eliminated both rent dissipation and resource misallocation was a substantial 0.46 percent of gross domestic product.

With autos, however, rationing was by two methods, which Tarr assesses as not significantly increasing the social costs of the price controls above the Harberger costs. One method was waiting lists. The other, allocation to preferred individuals, wasted some resources through classically rent-seeking or directly unproductive profit-seeking (DUP) activities. But it also had the socially beneficial effects of improving efficiency in other state-owned firms. (In some firms, the autos were awarded to the most productive coal miners or factory workers — which improved productivity in government factories where lack of effort had been a problem.)

Tarr also shows that import liberalization produces greater benefits when there are domestic price controls with rent dissipation, because import liberalization reduces the rent.

All things being equal, the elimination of price controls for both autos and televisions had the effect of decreasing imports, as more domestic autos were produced and sold. The implication is that — contrary to the Polish government's intention — price controls were a trade distortion that increased imports: that is, they implicitly subsidized imports. Tarr estimates the rate of subsidy of imports (the ad valorem rate of subsidy to imports that would increase imports to the level before price controls were eliminated) to be 43 percent for autos and 22 percent for color TVs.

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WHEN DOES RENT-SEEKING AUGMENT THE BENEFITS OF PRICE AND TRADE REFORM ON RATIONED COMMODITIES

by
David G. Tarr

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WHEN DOES RENT-SEEKING AUGMENT THE BENEFITS OF PRICE AND TRADE REFORM ON RATIONED COMMODITIES

I. INTRODUCTION

In January of 1990, Poland embarked on a major reform (known as the "Big Bang") with the aim of creating a market economy. In addition to the macroeconomic features of the reform, the reform included decontrol of virtually all prices and a large devaluation of the Polish zloty. These latter reforms eliminated virtually overnight the massive excess demand that had existed for many Polish commodities and allowed the authorities to make the zloty internally convertible.

The macroeconomic features and accomplishments of the Polish reforms have been extensively analyzed and debated (see, Rocha and Coricelli, 1990; Rosati, 1990; Pinto, Coricelli and de la Calle, 1990; and Lipton and Sachs, 1990). The most notable success of the program is that it succeeded in quickly stopping hyperinflation. The first three papers cited above, however, have reported a decline in industrial output during the first 8 months of 1990 of between 25 and 30 percent, compared with the same period one year earlier. Lipton and Sachs (1990) strongly contend, however, that the output decline grossly exaggerates the fall in living standards in Poland because by freeing prices the reform eliminated shortages and queues and the associated waste of time.[1] Alternatively stated, when one takes into account the huge waste of resources in rent-seeking (or directly unproductive profit seeking "DUP" activities) of the

pre-1990 regime, there would be little or no fall in the 1990 standard of living.

These issues point to the need for empirical estimates at the microeconomic level of the impact of price decontrol and trade liberalization, where the estimates incorporate an assessment of any additional benefits from eliminating socially unproductive rent-seeking activity due to the price controls. This is all the more true insofar as Hungary and Czechoslovakia have made analogous reforms.[2] In this regard, however, while the early theory of rent-seeking tended to focus on cases where rent-seeking activities exactly dissipated available rents, many models (which are surveyed in appendix C) have now been developed in which, depending on the nature of the market and the method of allocation of rents, wasteful rent-seeking activities may be greater or less than the available rents.

This paper examines two important markets in Poland: autos and color televisions. In so doing it provides empirical assessments of two phenomena, frequently discussed, but rarely estimated: (1) microeconomic policy changes in socialist economies, in this case price decontrol and trade liberalization; and (2) the extent of rent-seeking (or DUP) activities in two significant price controlled markets, and the relative magnitude of the traditional distortion costs and unproductive rent-seeking.[3]

We decompose the analysis of the costs of price control into two components: the classical ("Harberger") triangle of distortion costs; and a "Tullock" rectangle of rents. The extent of rent dissipation has a very strong effect on the estimates. As we explain below, we assess that wasteful rent dissipation in color televisions exactly offset the rents because queues formed which dissipated the rents in the manner of the model developed by Barzel (1974). Then, based on our model in color televisions (calibrated to 1988 data and in the

central elasticity case) the rent dissipation is estimated to equal about 10 times the triangle of distortion costs, for a total cost of .46 percent of Polish GDP. In autos, however, rationing was by two methods which we assess as not significantly increasing the social costs of the price controls above the Harberger costs. One method was waiting lists. The other method, allocation to preferred individuals, involved the waste of some resources through classical rent-seeking or DUP activities, but also had socially beneficial effects of improving efficiency in other state owned enterprises, i.e., of reducing X-inefficiency in other industries. In autos then, with no rent dissipation, the triangle of distortion costs was the entire cost of the price control program in autos; it equaled .29 percent of GDP.

We also find that ceterus paribus, the elimination of price controls, in both autos and televisions, had the effect of decreasing imports as more domestic autos were produced and sold. This implies that, contrary to any desire of the government of Poland, the price controls were a distortion to the trade regime resulting in increased imports, i.e., they were an implicit subsidy to imports. The rate of implicit subsidization (defined as the ad valorem rate of subsidy to imports that would increase imports to their original level prior to the elimination of the price controls) is estimated to be 43 percent in autos and 22 percent in color Tvs.

The foreign trade regime of Poland, as of early 1989, was largely open with one significant exception: exporting enterprises had to surrender, on average, 70 percent of their foreign exchange earnings to the central government at the official exchange rate.[4] This represented a significant disincentive to exports, because the official exchange rate was about 20 percent of the parallel market exchange rate. Although foreign exchange restraints have been extensively

analyzed at the theoretical level,[5] these efforts have not quantitatively assessed the welfare effects of aggregate foreign exchange restraints in particular markets. The paper also investigates the interrelationship between the liberalization of the foreign exchange policy and domestic price controls, with and without rent dissipation. Constraining imports increases demand for the domestic price controlled variety of the product; this will increase the rents on the domestic product and may increase wasteful rent-seeking activity. It is found, therefore, that in color televisions, with dissipation of rents, the costs of import restraints are 4 times greater when the effect of the rent dissipation in the market for domestic autos is incorporated.

It is found, in the central elasticity case, the traditional distortion costs of the foreign exchange distortions in the autos market were about .1 percent of Polish GDP, and were about .05 percent in color televisions. In color televisions, the costs were augmented by induced wasteful rent-seeking for the domestic variety; thus, the total costs of the foreign exchange restraints in color televisions were about .21 percent of GDP.

The paper is organized as follows. In section II institutional details of the auto and color TV markets in Poland are discussed. This section lays out the stylized facts that are incorporated in the model, and discusses the methods of allocating autos and color Tvs in the context of the rent-seeking and rent dissipation literature. Results are presented in section III.

In appendix A, we develop the model of the Polish auto and color television markets. We "benchmark" the model to the policies and stylized facts that prevailed in 1989. It is a differentiated product model in which consumers optimize their consumption expenditures across commodities subject to rationing constraints on their purchase of domestic autos and color televisions, and an

implicit tariff on imports due to the foreign exchange policy (discussed below); firms optimize subject to price controls. The model explains the existence of permanent excess demand for the rationed commodity at the controlled prices. Although the results of the model are intuitively explained through the use of graphs in section IV, the formal derivation and some of the comparative static properties differ in significant ways from conventional models without rationing. These results are similar, however, to those obtained by Neary and Roberts (1980). The data sources are discussed in appendix B, and in appendix C we review the literature on rent-seeking (DUP) activities as it relates to rent dissipation under price controls.

II. AUTO and COLOR TV MARKETS IN POLAND

Color TVs

With the exception of the method of allocating domestic goods under price control, the basic structures of the auto and color TV markets in Poland in 1989 were similar. Imported and domestic TVs are not homogeneous, i.e., imported TVs are regarded as being of higher quality. Except for small tariffs and the implicit tax on foreign exchange discussed above, importing of color TVs was free. One did not need to go through the official foreign trade organization to import the TV, and foreign exchange was available (subject to an implicit import tax) if one had enough zloty. Thus, the market for imported color TVs cleared.

Domestic color TVs were in severe shortage. The average domestic official price in 1988 was controlled at 394,000 zloty ($136 at the parallel market exchange rate.) At this controlled price, there was great excess demand. Due to the excess demand, the supplies were allocated in a negotiation process between producers and internal trade organizations (with a representative of the Ministry

of Internal Market present). Internal trade organizations are: regional trade organizations, which have retail outlets (one for each of the 50 voivodships); rural cooperatives (CS Samopomoc Chlopska); and some small trading companies. Sometimes, in an effort to avoid the price controls, producers sold TV sets to their suppliers, demanding goods or services which were also under price control in return, in the fashion described by Kornai (1980).

The final consumer of the color TV, who wanted to pay the official price, has to wait before stores for days or weeks until a shipment arrived. Those who waited at the stores formed waiting lists, called "social waiting lists." These lists determined who had the right to buy a TV at that particular store when a shipment arrived. The rules of the waiting list were determined by the customers. Although there were cases where the lists were operated by the staff of the stores, they were unusual. At least one person from the list had to be at the store at all times, or a newcomer could start a list with his name at the top. Normal procedure obliged everyone on the list to appear at the store at least once per day at a designated time or his name would be deleted from the list. There were cases of people taking leave from work to assure that they would be able to buy a color TV, and of people who waited in line so they could resell the TV.

Domestic color TVs could be, and were, resold. There are open air markets where goods are sold (not limited to color TVs), and they are also sold through advertisements. This free market price is periodically reported in newspapers, and in 1988 it was two times the official price. Thus, the resale market for color TVs (both new and used) in Poland clears. Individuals who received a color TV at the official price obtained a rent equal to the difference in the price on

the resale market and the official price, but that rent had likely been dissipated through lost time in the queue.

Autos

Polish autos and imported autos are not homogeneous products. Poland imports autos from a number of foreign countries including Japan, Germany, Sweden,[6] as well as imports from the former Eastern bloc countries, most notably from Czechoslovakia and the Soviet Union. Imported vehicles generally sell for considerably more than that of domestic vehicles (on the domestic free market), and reflect assessed quality premia for the imports from Western countries.[7]

After the decontrol of prices in January 1990, the market for domestic autos in Poland cleared. Prior to that the market for domestically produced autos was characterized for many years by severe shortages. The official price of domestically produced autos was controlled at a level which induced great excess demand. The weighted average official price of a Polish made auto in 1988 was 1.27 million zloty. At the parallel market exchange rate prevailing in mid-March 1989 (2900 zloty to one US dollar), this was equal to 434 US dollars.

Given the existence of huge excess demand at the official prices, allocation schemes were developed to ration those autos available for the domestic market. These schemes fell into two principal categories: (1) a lottery system; and (2) "asygnata." In 1981, more than 1.5 million people entered the lottery for the right to buy a Polish made car at the official price. The outcome of the lottery was that all participating individuals received the right to buy a car in a certain year. Lucky individuals received the right to buy the car in 1981 or 1982. Unlucky individuals received later years throughout the 1980s. Individuals paid 50 percent of the official price of the vehicle to enter the lottery, and additional annual payments so that the price was to be paid by the

time their delivery date arrived. Insufficient numbers of cars were allocated to meet the requirements of the lottery system, however, so that in early 1989 there were about 400,000 people waiting for prepaid 126ps and 70,000 for prepaid FSOs.

The second method of allocating the cars was called the asygnata system. The Ministry of Industry and the Ministry of Internal Trade decided how to divide the cars available for domestic consumption. This includes a decision on how many cars should go to the lottery or prepayment system. Cars allocated to the asygnata system were available for allocation as intermediate input use in enterprises and, more significantly, for individuals. Asygnatas given to individuals are awarded either by Ministers (or committees acting on their behalf) or by directors of enterprises. Asygnatas have generally been awarded to the staff of large organizations such as coal mines, central or local bureaucracies, country physicians, journalists, taxi drivers, handicapped persons and groups associated with the Council of Ministers. The number of cars estimated to be in the asygnata system in 1988 was between 120 and 140 thousand vehicles out of 177 thousand produced for the domestic market.[8]

A final key piece of the market for domestic cars in Poland is the existence of a free market for cars offered for resale. Large open air markets exist in Warsaw and a few other large cities. In addition, trades occur through advertisements in newspapers.[9] In this free market, one can buy and sell new or used cars, domestic or foreign. In particular, the price of newly produced domestic autos clears on the resale free market. This has a number of important implications: (1) any individual can buy a domestic vehicle if he is willing to pay the market clearing price for the domestic vehicle; (2) individuals receiving a vehicle at the official price receive a rent equal to the difference between the market clearing price and the official price. They may choose to sell the car

and capture the rent in cash or use the car because they value the use of the car more than the price they would receive on the free market. In the latter case, they are consuming the rent. In either case, the producers of the cars do not receive the incentive to produce more cars through the higher price.[10]

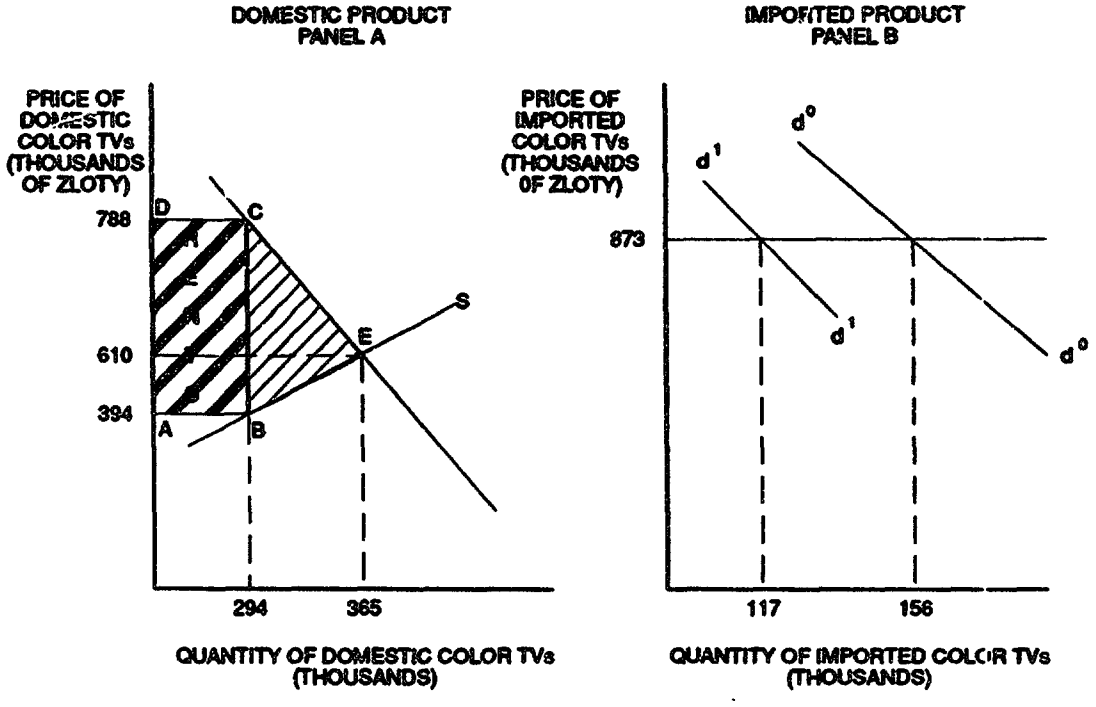
In 1989, even the least expensive Polish auto, the 126p, cost an estimated 17.5 months of wages for the average Polish worker at the official controlled price. At the price on the free market, the 126p costs an average of 63.5 months of wages.[11] Thus, the value of the rent from receiving an allocated auto was worth approximately 46 months of wages.

Regarding imported autos, it was possible during the late 1980s to import these vehicles freely, provided the buyer could obtain "hard" currency. Organizations, such as POLMOT, would import the vehicles for a quoted price in hard currency. The 1989 liberalization of organizations with the right to import, opened this process to competition, and reduced the profit margins of these importing organizations.[12] In addition, the mid-March 1989 liberalization of the currency exchange, whereby Poles could freely exchange zloty for dollars internally (at parallel market rates), implies that the market for imported autos cleared.[13]

Implications for Wasteful Rent Dissipation

Color Televisions. Full and exact rent dissipation, in accordance with the classic model by Barzel (1974), appears to be the best way to characterize the allocation of domestic color televisions. As described by Barzel, an individual who is deciding whether to join the queue, must assess the value of the rent received versus the opportunity cost of his time in the queue. The full price to the buyer is the money price of the good plus the opportunity cost of the buyer's time. Subject to an uncertainty premium, he will join the end of the queue, if

Figure 1.
Impact of Eliminating Price Controls on Polish Color TVs a/



a/ CENTRAL ELASTICITY CASE

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the value of the rent exceeds the value of his time. Then the queue lengthens until the full price to the buyer (including the opportunity cost of time) exactly dissipates the rents. This implies that the full price to the consumer rises to D (in figure 1), which is higher than the market clearing price without a price control, and explains why queuing is a very inefficient method of allocating rationed goods.

Autos. In autos, however, the situation is more complicated. First, consider the asygnata system, under which the majority of the autos were allocated. On the one hand, many auto awards (such as groups favored by the Council of Ministers) likely fit into the socially wasteful category of classical rent dissipation or DUP activity. That is, awards going to the politically favored, and awards going to some professions will involve lobbying type activity that is socially wasteful. Moreover, some of the activities involved may not simply be socially wasteful, but socially counterproductive. For example, if society at large values a diverse press, but the allocation of awards to journalists facilitates the control of the press by non-representative authorities, the awards are likely counterproductive. The "lobbying" by the journalists is not simply a waste of resources, but conveys negative externalities on the rest of the economy.[14]

On the other hand, in cases were the autos were awarded to coal miners or factory workers who were assessed to be the most productive workers, due to a second best situation, a socially useful function was played by the asynata system. A low level of effort and efficiency is reported in many state owned factories and mines. Competition for these autos among factory workers raises productivity and is socially productive, i.e., it reduces X-inefficiency. It seems inappropriate, however, to define the allocation of autos to the most

productive workers as rent-seeking. Rather, it is equivalent to the government taxing the auto sector (by requiring delivery of the goods to the government at the controlled price and reselling them at the market clearing price), and using the taxes it receives to pay bonus payments to workers. Then the workers are merely receiving higher wages in accordance with the value of their marginal product; and since the bonus payments induces greater supply of effort, the payments are not rents.[15] Regardless of whether we call the payments to workers a bonus wage or a rent, the key point is that the Tullock rectangle is not socially dissipated, but adds to output elsewhere in the economy.

Now consider the lottery system, which is obviously a method of random allocation for forming a waiting list. The evidence is that there was little one could do in the way of lobbying to alter the timing of receipt of an auto through the lottery system.[16]

Thus, we assess that the lottery system caused very little rent dissipation, and the asygnata system had socially wasteful, pernicious and productive aspects. It is impossible to determine which dominates; for the purpose of the estimation, we assume that, on balance, there was no socially wasteful rent dissipation from the price controls on autos. Since the judgement involves arbitrariness, we also calculate the Tullock rectangle.

Imports. Regarding imports, Krueger (1974) has noted that quantitative restraints on imports may lead to rent dissipation as firms compete for the right to import the rationed good. As mentioned above, however, there was no license or right to import for which it was necessary to compete. Anyone with the foreign exchange could import an auto or television. Nonetheless, the import market in 1989 was distorted by the aggregate surrender requirements on foreign exchange; this was an implicit tax, however, due to the premium on foreign exchange, rather

than a quota on autos. We assume, therefore, that there were no DUP activities in imported autos or color televisions.

III. RESULTS

Price Decontrol

The first policy that we simulate is the elimination of the price control. The results, under different elasticity scenarios, are presented in table 1 and depicted in figures 1 and 2. Curves representing the initial equilibrium are depicted with superscripts zero, and those of the new equilibrium after the policy shift are shown with a superscript 1. If domestic price controls are removed, there will be an expansion of domestic output due to the greater incentive of the higher prices. In the short run, output expansion is likely to be small due to capacity constraints, but we view our model as a long run model. The greater production of Polish vehicles and color televisions increases welfare, because the value to consumers of additional domestic vehicles exceeds the opportunity costs of the resources to produce these vehicles. That is, there is a Harberger triangle of benefits equal to the area BCE in figures 1 and 2.

In the initial price control situation there is a rectangle of rents equal to ABCD. In color televisions, we have argued that these rents are dissipated, so that the value of this rectangle represents an additional gain to society when price controls are removed. In the central elasticity case, the rectangle of rents equals 116 billion zloty (about 0.4% of Polish GDP), which is about 10 times the triangle of distortion costs. Moreover, unlike the distortion cost triangle (where the full gains to society will occur with a significant lag), since the queues vanished almost overnight, the gains from the rectangle of rents were achieved very rapidly. Thus, the color television case is consistent with

TABLE 1

IMPACT OF ELIMINATION OF DOMESTIC PRICE CONTROLS ON THE AUTO AND COLOR TELEVISION MARKETS IN POLAND[a/]

	1988 Data		Low Elasticities		Medium Elasticities		High Elasticities	
	Autos	TVs	Autos	TVs	Autos	TVs	Autos	TVs
1. Domestic Controlled Price	1.27	.394	n.a.[b/]	n.a.	n.a.	n.a.	n.a.	n.a.
2. Domestic Free Price	3.54	.788	2.52	.610	2.52	.610	2.52	.610
3. Import Price (tariff inclusive)	4.26	.873	4.26	.873	4.26	.873	4.56	.873
4. Domestic Quantity	177	294	210	327	250	365	351	455
5. Import Quantity	61.6	156	43.5	135	30.7	117	15.2	87
6. Welfare Gains								
i. Triangle of Distortion			37	7	82	14	200	32
ii. Rectangle of Rent Dissipation[c/]			0	116	0	116	0	116
iii. Total			37	123	82	130	200	148
7. Welfare Gains as a Percentage of GDP			.13%	.43%	.29%	.46%	.70%	.52%
8. Subsidy Equivalent to Imports due to the price controls[d/]			44%	23%	43%	22%	42%	21%

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a/ Prices are in millions of 1988 zloty, quantities in thousands of autos or color televisions, welfare gains in billions of 1988 zloty or percentage of 1988 GDP.

b/ n.a. means not applicable in the simulation.

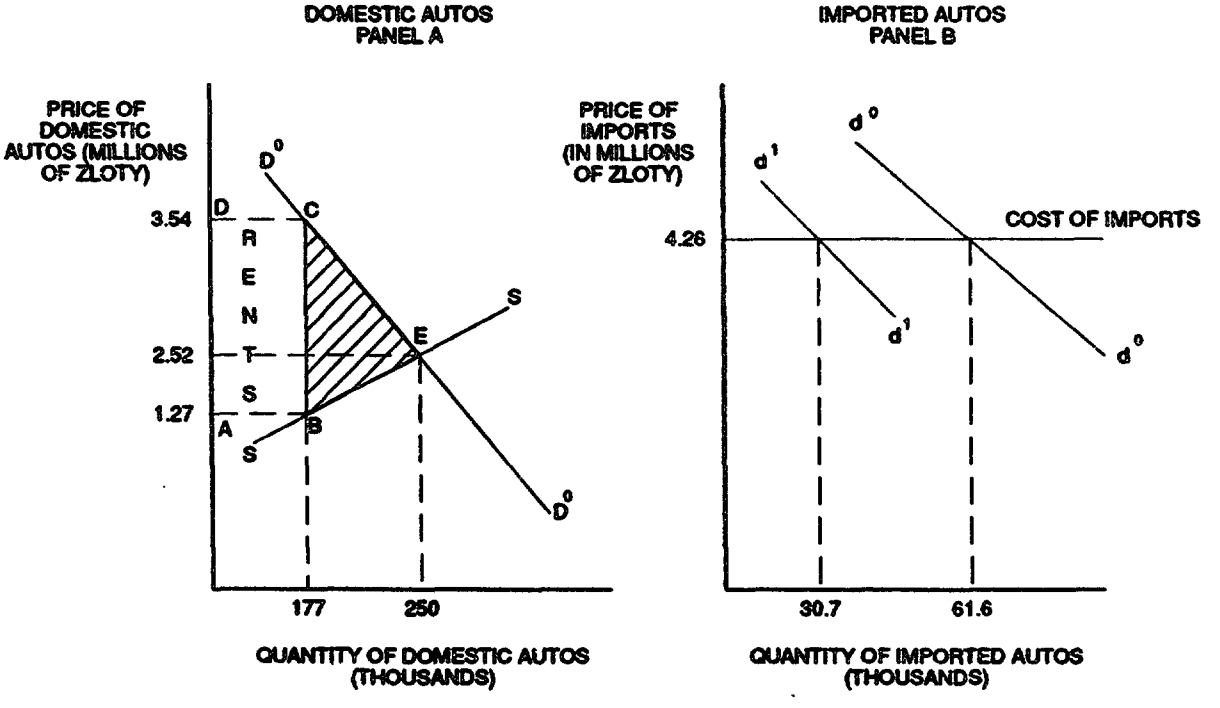
c/ The rectangle of rents in autos equals 402 million zloty.

d/ The rate of subsidy to imports necessary to reduce imports to their 1988 level, once price controls are removed.

Source: Model Estimates

c:data\tb1autos.tvs

Figure 2.
Impact of Eliminating Price Controls on Polish Autos a/



a/ CENTRAL ELASTICITY CASE

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the view that, ceterus paribus, freeing prices resulted in an immediate and substantial improvement in the standard of living.

In the case of autos, the rectangle of rents equals 402 million zloty which is about 5 times the Harberger triangle costs of 82 million zloty in the medium elasticity case. As discussed above, however, we assess that the rectangle of rents did not represent an additional loss to society. Thus, despite the fact that the Harberger triangle for autos is about 6 times larger than in color televisions, the total benefits from price decontrol in color televisions is larger than in autos.[17] Given these estimates of rents and the uncertainty in the assessment of their dissipation, however, the reader is able to draw his own conclusions regarding the costliness of the auto price controls.

As important implication of the model in appendix A is that due to rationing of domestic autos (televisions), the quantity of domestic autos (televisions) is a parameter in the demand function for imported autos (televisions). An increase in domestic output reduces the demand for the import substitute. Due to the price control, any increase in the production of domestically produced autos is purchased, the substitution effect of increased domestic autos on the demand for imported autos is likely to be strong. The domestic controlled price is also a parameter in the demand function for imported autos, and an increase in the domestic controlled price has the effect of decreasing demand for imported autos through an income effect.[18] Thus, when price controls are relaxed, there is a decrease in the demand for imported autos due to the increase in the controlled price, but also from what is numerically much more important, an increase in domestic production.

Thus, in the case of autos, as a result of eliminating the price controls, imports are reduced to 30.7 thousand units, from 61.6 thousand units. This leads

to the following question: What subsidy rate to imports would be required to increase imports back to their original level, if the price controls were not in effect? We get the estimate of 43 percent for autos and 22 percent for color televisions.[19] That is, without domestic price controls the government would have to pay 43 percent of the cost of imported autos, to induce consumers to import as many autos as they would without price controls. Any smaller subsidy, and consumers will import fewer autos than in the original 1988 situation after price controls are eliminated. Thus, although the government of Poland has no intention of subsidizing imported autos, the system of price controls was a very substantial implicit subsidy to imports.[20]

Improved Foreign Exchange Policy

The second policy change we simulate is an improvement in the exchange rate policy, with price controls remaining in place. The results are presented in table 2 and depicted in figures 3 and 4. The parallel market exchange rate (as of March 1989 it was 2900 zloty to one US dollar) was itself distorted (too high) due to the surrender requirements (at the official grossly overvalued exchange rate) imposed on exporters for about 70 percent of their foreign exchange earnings. Tarr (1990a) has estimated the shadow foreign exchange rate at about 63 percent of the parallel market exchange rate (more than 3 times greater than the official exchange rate), where it was the parallel market exchange rate that represented the cost of foreign exchange for individuals.[21] The opportunity cost of imports to Poland were more properly valued at this shadow exchange rate. At the parallel exchange rate, individuals were discouraged from consuming imported autos. If aggregate policies were changed (such as a devaluation as occurred in 1990 or reducing the surrender requirements of exporters) providing greater incentive to exports and thereby inducing a lower exchange rate equal to

TABLE 2

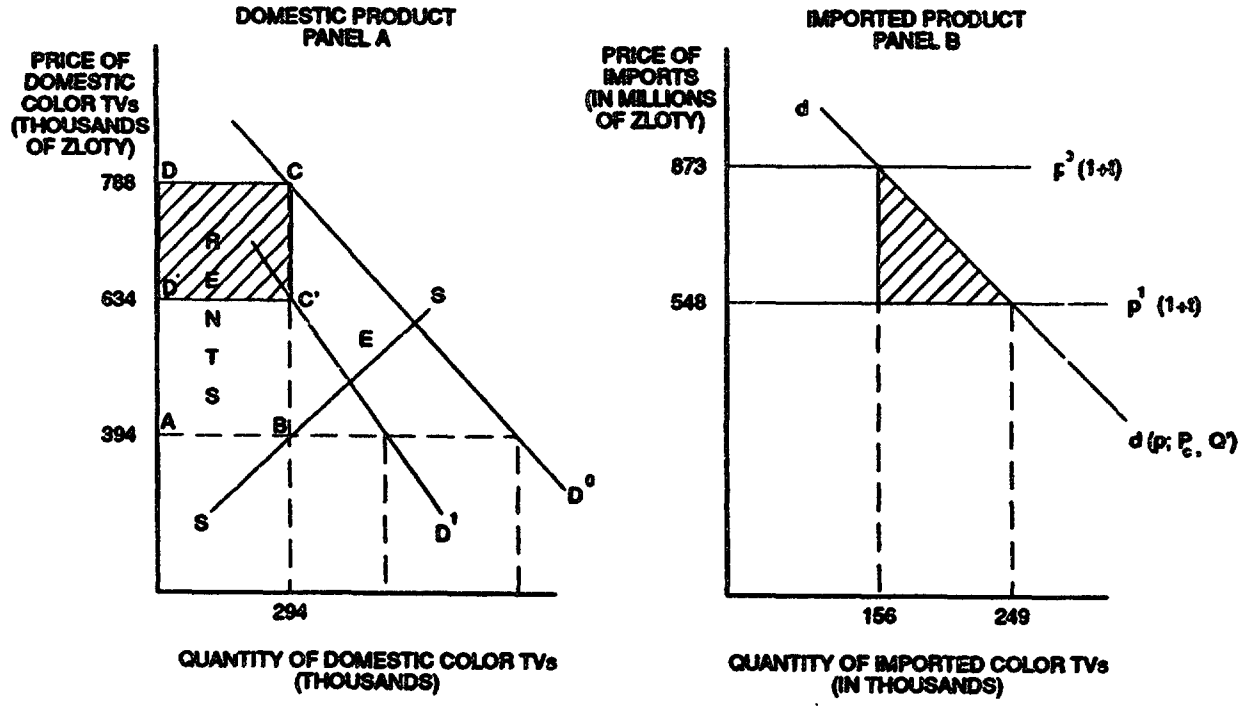
IMPACT OF ELIMINATING MACROECONOMIC FOREIGN EXCHANGE
RESTRICTIONS ON THE AUTO AND COLOR TELEVISION MARKETS IN POLAND a/

	1988 Data		Low Elasticities		Medium Elasticities		High Elasticities	
	Autos	TVs	Autos	TVs	Autos	TVs	Autos	TVs
1. Domestic Controlled Price	1.27	.394	1.27	.394	1.27	.394	1.27	394
2. Domestic Free Price	3.54	.788	3.09	.705	3.00	.634	2.96	.602
3. Import Price (tariff inclusive)	4.26	.873	2.67	.548	2.67	.548	2.67	.548
4. Domestic Quantity	177	294	177	294	177	294	177	294
5. Import Quantity	61.6	156	77.8	197	98.2	249	156.6	397
6. Welfare Gains								
i. Triangle of Distortion			13	7	29.0	15	75	39
ii. Rectangle of Rent Dissipation			0	24	0	45	0	55
iii. Total			13	31	29	60	75	94
7. Welfare Gains as a Percentage of GDP			.05%	.11%	.10%	.21%	.27%	.33%

a/ Prices are in millions of 1988 zloty, quantities in thousands of autos or color televisions, welfare gains in billions of 1988 zloty or percentage of 1988 estimated GDP.

Source: Model Estimates

Figure 3.
Impact of Eliminating Foreign Exchange Restraints on Polish Color TVs a/



a/ CENTRAL ELASTICITY CASE

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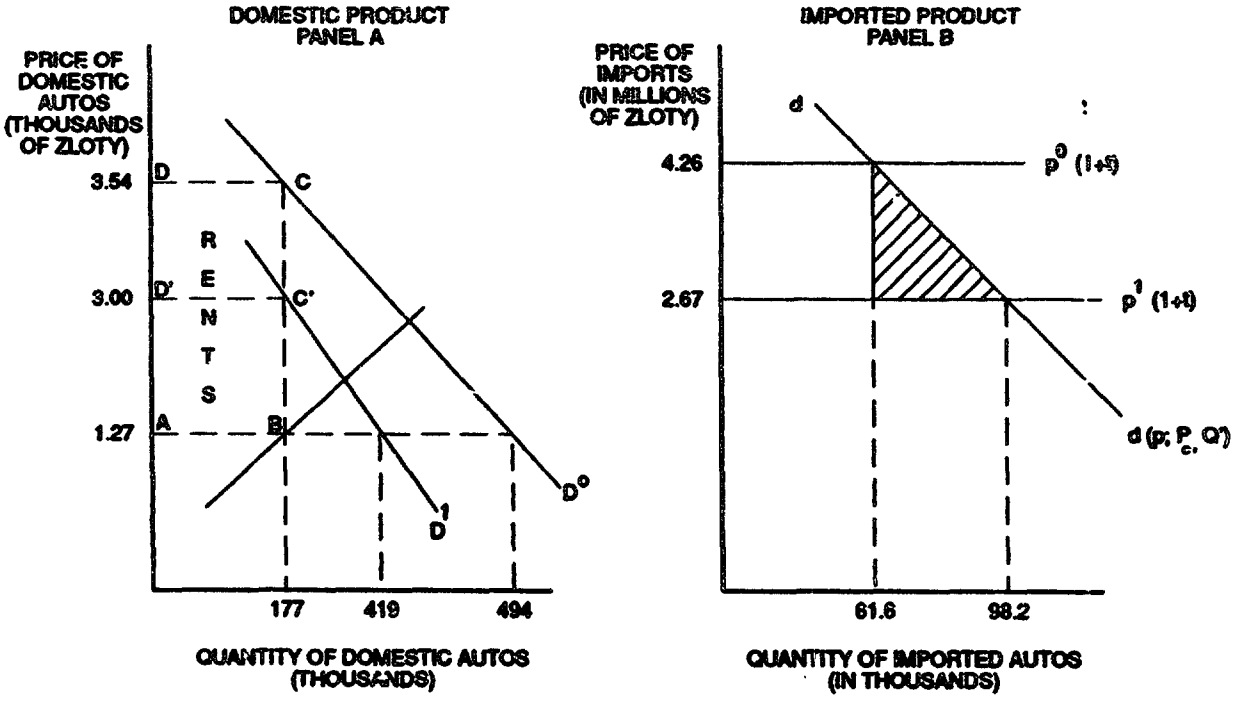
Figure 4.
Impact of Eliminating Foreign Exchange Restraints on Polish Autos a/



a/ CENTRAL ELASTICITY CASE

the shadow exchange rate, individuals would import more, generating consumption efficiency gains.[22]

The decrease in the price of imports reduces the demand for domestic autos, because the goods are gross substitutes. The decrease in the demand for domestic autos, results in a decrease in the price of autos on the free resale market for autos. Consequently, there is a reduction in rents of domestic autos. There is no feedback effect on the price of imported autos, however, because, under rationing of domestic autos, the demand for imported autos depends on the market for domestic autos only through the controlled price in the domestic market and the quantity of domestic autos produced (see equation 3 of the appendix), neither of which have changed.

In both autos and televisions, the improved foreign exchange policy results in a triangle of benefits in the import market, which is shaded in panel B of figures 3 and 4; this is a traditional Harberger type triangle where the marginal valuation of imports by consumers exceeds the marginal costs to society. In addition, whether or not there is rent dissipation has a strong effect on the welfare results through second best effects. Since import liberalization reduces the demand for the domestic substitute, it reduces the rent on domestic autos and color televisions to the smaller rectangle ABC'D'; thus, the reduction in rents is equal to the rectangle DD'C'C. In color televisions this should reduce queuing time, and therefore constitutes an additional benefit of import liberalization. This is a second best type benefit from the foreign exchange liberalization, since it would not be a gain without the existence of the price control distortion in the domestic market. In the case of autos, where we have argued that the rents are not dissipated, there is no second best welfare effect in the domestic market.

In the central elasticity case, the second best benefits of reduced rent dissipation in domestic color televisions (of 45 billion zloty) are 3 times the direct distortion costs in the import market. Because there are no benefits from reduced rent dissipation in autos, the total benefits of foreign exchange liberalization in color televisions (0.21% of GDP) are about twice those of autos.

Regarding the effect of the elasticities, as the demand curve for imports becomes more elastic, it is evident from figures 3 and 4 that the triangle of estimated distortion costs increases. Cross elasticities also increase in the high elasticity case. Then in response to the decline in the price of imported autos, the demand for domestic autos on the free market shifts in by more in the high elasticity case. This implies a greater reduction in rent and greater benefits from reduced rent dissipation. The triangle of distortion, however, becomes a larger share of the total benefits as elasticities increase, in part because the rectangle of reduced rent dissipation is limited by the finite amount of rent dissipation in the initial equilibrium.[23]

APPENDIX A

THE MODEL FOR AUTOS AND COLOR TVs

Quality differences between Polish autos and imported (especially from the West) are considered quite significant such that a differentiated model is necessary.[24] The essential feature of the Polish domestic auto market is that it is in shortage.

Regardless of the price on the free resale market for domestic autos, aggregate production and consequently consumption of domestic autos is fixed (unless the official price changes). Within the range of the relevant policy experiments to be considered, whatever is produced and offered at the official controlled price (which we denote by $P_{c)}$ will be purchased by domestic consumers.

Let there be three goods: domestic autos (Q), imported autos (q) and a composite of other goods (X). Assume that the consumer is a representative consumer and wishes to maximize utility u(Q, q, X), subject to income and prices. Our objective of this representative consumer model is to derive the demand function for imported autos. Clearly the representative consumer model is not suitable for deriving the demand function for domestic autos on the free market, since that involves differing valuations of a domestic auto among consumers. We relax the representative consumer assumption below in order to derive the demand function for domestic autos on the free market.

Since the consumer is representative, he is assumed to receive a proportionate share of total autos allocated. Let $Q = Q'$ denote the fixed amount of domestic autos allocated to the consumer. There is a resale market for

domestic autos, which clears, but sales on this market do not affect the quantity of domestic autos consumed, which is fixed at nQ' (where n is the number of consumers). Sales on the resale market only represent income transfers among consumers. Moreover, since they are only transfers, they do not affect total income available to <u>all</u> consumers for purchase of the other goods, q or X. Thus, for the purpose of deriving the aggregate demand function for auto imports, we may ignore the resale market. The consumer consumes his fixed allocation of Q = Q', for which he pays P_C and his problem is reduced to:

(1) $\max u(Q', q, X) \quad S.T. \; Y = P_C Q' + p'q + P_X X.$

where Y = income, P_X = the price of X, p' = the tariff inclusive price of q, and the other variables have been defined above.

Define $U(q, X; Q') = u(Q', q, X)$

and $Y' = Y - P_C Q'$.

U is utility as a function of q, and X with Q' as a parameter; and Y' is residual income available for purchase of q and X after the consumer purchases Q' at the controlled price.

Then the consumer's utility maximization problem may be further reduced to:

(2) $\max U(q, X; Q') \quad S.T. \; Y' = p'q + P_X X$

From 2, maximization of U subject to Y' yields that the consumer's demand function for q is:

(3) $q = d[p', P_X; Y'(P_C, Q'), Q']$

where the parameters on which residual income depend have been explicitly incorporated. Note that the demand function depends on both P_C and the additional parameter Q'. Both P_C and Q' have an effect on the demand for q through their impact on Y'. In addition, because the utility function depends on the additional parameter Q', it is included separately as a parameter.[25]

Define the free market price of domestic autos on the resale market as P. Note that P is not included in the demand function for imported autos. This is because P has no effect on the amount of domestic autos consumed, due to the shortage, i.e., there is no substitution effect; and a change in P has a redistributive effect among consumers, but does not affect aggregate residual income available of all consumers for the purchase of q or X, i.e., there is no aggregate income effect of a change in the free market price.

That is we can completely characterize the aggregate quantity demanded of domestic autos (nQ'), imported autos (from equation 3) and the composite other good (an equation of the same form as 3) without reference to the free market price P. This result derives from the fact that we are conceiving of our consumer as representative, who consumes his allocated share of autos. Below we shall explain the demand function for domestic autos on the free market, and will have to depart from the representative consumer model; but that departure will not affect the demand curve for imported autos or the composite good, since, as explained above, sales among consumers of domestic autos are only rent transfers.

Finally, before reaching the functional form implemented in the model, we invoke a standard assumption in applied microeconomic modelling. We assume that utility is weakly separable between aggregate auto consumption and the composite good X. This implies that the demand functions for domestic and imported autos may be formulated without explicit reference to the price of the composite good X. The price of the composite good will affect demand for autos only through its impact on the income allocated to aggregate auto consumption. Since we are conducting comparative statics experiments, we assume that the impact of income and other variables are incorporated into the constant of the demand function,

and for our empirical applications we adopt the following functional form representation:

(I) $\ln(q) = a + b \ln(P_c) + c \ln [p(1+t)] + s \ln(Q)$ (Demand for imported autos)

where t is the tariff rate, so that $p = p'/(1+t)$ is the tariff exclusive price of imported autos.

The Demand Function for Domestic Autos

As indicated above, the controlled price of domestic autos is so low, that the aggregate amount offered by domestic firms will be purchased. That is, for changes in the controlled price of domestic autos which are below the free market price, the quantity demanded of domestic autos will not change because the price that affects the quantity demanded of domestic autos at the margin is the free market price.

For some purposes, however, it is necessary to know the Marshallian market demand curve for domestic autos if the quantity allocated of domestic autos were not fixed. This would allow assessment of rent transfers among consumers, and, more importantly, determine new equilibrium prices and welfare effects in the event of price decontrol. Moreover, analogous to the concern of Charemza et al. it would allow computation of the amount of excess demand.

Suppose then that there is no price control and the quantity of domestic autos available to the consumer is a variable over which he can optimize. Then the form of the Marshallian demand function for domestic autos is standard:

(4) $Q = D(P, p', P_X; Y)$

If we depart from the assumption that all consumers receive a proportionate allocation of autos, equation (4) would also explain the demand for autos under price control. The key change is that if the consumer has received an officially

allocated auto, he incurs an opportunity cost of P if he decides to consume it. That is, we conceive of his income being augmented by the rental value of the auto on the resale market, and he decides to consume an auto or not according to ordinary utility maximization subject to augmented income. Consumers who do not receive an allocated auto would have a demand function of the same form as (4) except that income is not augmented by the rental value of the auto. The aggregation of individual demand curves yields the market demand curve for domestic autos on the free market of the form of equation (4).

Again using the weak separability assumption, the price of P_X is not explicitly incorporated and income effects are incorporated in the constant of the equation, yielding the form employed in the empirical work:

(II) $\ln Q = A + B \ln P + C \ln p(t+1)$.

As mentioned above, Neary and Roberts (1980) have developed the technique of "virtual" prices that would allow the estimation of the price that would clear the market for domestic Polish autos, provided the form of the demand function, the initial quantity and controlled price are known. Fortunately, however, we have directly observable data from the resale open air market for domestic autos for the price of domestic autos that clears the resale market. An individual who receives no initial allocation of domestic autos can go to these markets and purchase as many new domestic autos as he likes at the free market price. Individuals who decide to consume their allocated autos, pay an opportunity cost equal to the free market price. Thus, it is possible to obtain observations of a point on the demand curve II, since the free market price is the price at which the Marshallian demand curve clears for the number of autos produced, given other parameters in the economy affecting demand.[26]

With the demand curve II, it will be possible to determine the value to consumers of additional units of Q deriving from an easing or termination of domestic price controls. Equation 3 will continue to be employed for the demand function of imported autos in the price decontrol experiment. One can think of a sequential easing of price controls, approaching full price decontrol, where the rationale for equation I holds at any particular controlled price and fixed quantity. Conceiving of the problem in this manner avoids the problem of calibrating a new demand function for imported autos (which would depend on the free market price of domestic autos) for which there is no observed data.

Equations of the Simulation Model

The model is characterized by equations I-IV. Domestic variables are denoted by uppercase letters and imported variables are denoted by lower case letters.

(I) $\ln(q) = a + b \ln(P_c) + c \ln [p(1+t)] + e \ln(Q)$ (Demand for imported autos)

(II) $\ln(Q) = A + B \ln(P) + C \ln[p(1+t)]$ (Demand for domestic autos on the free market)

(II') $P_c = P_c'$ (The domestic controlled price is fixed)

(III) $\ln(Q) = D + E \ln(P_c)$ (Supply of domestic autos)

(IV) $p(1+t) = k$ (Supply price of imported autos, tariff inclusive)

Equation I and II are the demand functions for imported and domestic autos, respectively which have been discussed. Equation II' states that the controlled price is fixed at P_c'. It is this equation that applies in the first policy experiment, where price controls are maintained, and the import regime is liberalized. When price controls are removed, equation II replaces equation II'.

In the first policy experiment, however, equation II is used to estimate the value of the rent from receiving an allocated auto, and the amount of excess demand.

Equation III is the supply function for domestic autos. Auto producers are assumed to face increasing marginal costs of production. To increase production would require more labor, for example. In order to attract additional workers to an auto company requires paying higher wages, because there is little unemployment in Poland. Increasing marginal costs implies that the supply curve is upsloping;[27] and it depends on the price received by the firms, which is the controlled or official price. In addition, however, Poland is an economy facing generalized shortages. As a result, some inputs into auto production will be fixed or close to fixed. It follows from the well-known LeChatelier Principle, that the more inputs are in fixed supply, the more inelastic is the supply curve of the firm. Thus, we shall assume a very low elasticity of supply by Western standards, and simulate the results over a range of elasticities.

In equation IV, we adopt the small country assumption, and assume that imports of autos are supplied to Poland at a delivered price, in dollars, that Poland cannot influence. Poland does, however, have the ability to impose tariffs and influence its exchange rate, so that the price to consumers of imported autos in zloty can be altered.

Cross-Elasticities in the Demand for Imported Autos

From 3, one can obtain and interpret appropriate values for the cross-elasticities of equation (I). First consider the elasticity of demand for imported autos with respect to a change in the controlled price of domestic autos. Taking partial derivatives from 3:

$$\frac{\partial g}{\partial P_c} = \frac{\partial g}{\partial Y'} \frac{\partial Y'}{\partial P_c}$$

From the definition of Y':

$$\frac{\partial Y'}{\partial P_c} = - Q'$$

Thus b, of equation (I), can be expressed as

$$b = \frac{P_c}{q}\frac{\partial q}{\partial P_c} = \frac{P_c}{q}\frac{\partial q}{\partial Y'}(-Q')$$

Define the income elasticity of imported autos as

$$e = \frac{\partial q}{\partial Y'}\frac{Y'}{q}$$

Then rearranging yields:

$$b = -\frac{P_c Q'}{Y'} e = - SQ * e$$

where $SQ = \frac{P_c Q'}{Y'}$ is the share of residual income spent on domestic autos. That is, the cross elasticity of import demand with respect to the price of domestic autos, reduces to the share of residual income spent on domestic autos times the income elasticity of demand for imported autos. Based on the estimates of Charemza, Gronicki and Quandt (1988) who estimate small values for the income elasticity of demand for Polish autos, the value of e = .5 is assumed; then given data on SQ, b = - .02.[28]

Note that, although small the value of b is negative. This contrasts sharply with models that are equilibrium models. Here the increase in the controlled price of domestic autos does not induce an decrease in domestic quantity demanded, so there is no substitution effect. There is only an income effect of the domestic price increase, which reduces demand for all normal goods, including imported autos.

Now consider s, the elasticity of demand for imported autos with respect to the quantity of domestic autos. Differentiate 3 with respect to a change in

the amount of domestic autos allocated. The change in demand for imported autos is:

$$(6)\quad \frac{\partial q}{\partial Q'} = \frac{\partial q}{\partial Y' \partial Q'} \frac{\partial Y'}{} + \frac{\partial q}{\partial Q'}(\text{residual income constant})$$

6 decomposes the change in the demand for imported autos when the quantity of domestic autos changes into two components. the first term is the income effect on purchases of imported autos when an additional unit of domestic autos becomes available; and the second term is the substitution effect. This equation is analogous to the Slutsky equation and to equation 21 in Neary-Roberts.

Since $\frac{\partial Y'}{\partial Q'} = -P_c$, we have that

$$\frac{\partial q}{\partial Y'} \frac{\partial Y'}{\partial Q'} = \frac{\partial q}{\partial Y'}(-P_c).$$

Now consider the second term $\frac{\partial q}{\partial Q'}$.

First suppose that the goods are perfect substitutes. Then a one unit increase in the quantity of domestic autos available would, absent income effects, decrease the purchase of imported autos by exactly one unit. That is

$$\frac{\partial q}{\partial Q'} = -1.$$

If the goods are not perfect substitutes, a one unit increase in domestic autos will induce less than one unit decrease in imported autos, say -v, where $0 < v < 1$, is a product differentiation parameter, where smaller values imply the goods are less perfect substitutes. v is assumed, in this study to take the value .7.

Combining these results yields:

$$\frac{\partial q}{\partial Q'} = \frac{\partial q}{\partial Y'}(-P_c) - v.$$

Multiplying both sides by Q'/q and the first term by one in the form of qY'/qY', yields the elasticity s:

$$s = \frac{Q'}{q}\frac{\partial q}{\partial Q'} = - SQ * e - v\, Q'/q$$

The first term (- SQ * e) in the elasticity of import auto demand with respect to the supply of domestic autos, s, is identical to the elasticity of import auto demand with respect to the domestic controlled price. This is because it is the income effect of the change in quantity and it affects residual income in a symmetric manner to the price of domestic autos. What is of more practical importance, is that the second term (v Q'/q) numerically dominates the first. Thus, when we consider the simulation of decontrol of domestic prices, the demand for imports decreases; this is because the increase in the demand for imports due to the increase in P_c, is considerably less than the decrease in the demand for imports due to the increase in Q'.

The Cross-Elasticity in the Demand for Domestic Autos

Finally, we require the value C, the cross-elasticity of demand for domestic autos with respect to the price of imported autos. As mentioned above, we assume the consumer's utility function for autos (imported and domestic) is "weakly separable" from all other goods. Tarr (1990c) has shown that based on weakly separable utility a "modified Cournot aggregation condition" applies, which in this context reduces to:

$$(7) \quad SQ'*C + Sq*c + Sq = \frac{\partial Y_A}{\partial p'}\frac{p'}{Y_A}$$

where $Sq = \frac{p'q}{Y_A}$ $SQ' = \frac{PQ'}{Y_A}$

Y_A = income allocated to autos, and C and c are from equations I and II.

The shares are known data and we have an estimate of the own elasticity of demand. The term on the right of 7 is the elasticity of demand of income allocated to aggregate auto consumption with respect to a change in the price of imported autos. It is reasonable to assume that a change in the price of imported

autos has only a small impact on the income allocated to autos; we take this value to be .25. We thus solve 7 for C = .35 in the case of autos and C = .40 for color TVs.

In the case of autos, estimates of the own price and income elasticities are obtained from the econometric study of the Polish auto market by Charemza, Gronicki and Quandt (1988). Their broad conclusion is that the price elasticities of demand are high (usually greater than unity), but the income elasticity is low. Thus, in the central elasticity case, we take the own elasticities (B and c) to be equal to -1 and the income elasticity to be equal to .5. The income elasticity is used in the appendix to estimate the cross-elasticities. These values are: C = .35; b = -.01; and s = -2.0. In the central elasticity case, we assume the elasticity of supply with respect to the price received by auto producers is .5. The high and low elasticity estimates are obtained by doubling and halving all elasticity estimates, respectively.[29]

The model was calibrated to 1988 data. Based on the above, all parameters of equations I-IV are known except a, A and D. Thus, we obtain data on the values of Q, q, P, P_C, and p(1+t) for 1988 and assume that these values are a solution to our system of equations I-IV. The details of obtaining the data are discussed in the appendix B. Given the above values of the elasticities, this allows us to solve for the constants A, D and a. Note that the observed values of Q and P in 1988 are on the demand curve II, but there is a shortage in the market for domestic autos at the controlled price. Thus, we have calibrated the model out of equilibrium. [30]

APPENDIX B

DATA SOURCES IN AUTOS AND COLOR TVS [31]

In this appendix we describe the sources of the data which we used in the models of the text. Most of the data was obtained from the Polish government's Central Statistical Office (CSO) in Warsaw. Since we desired to have the most recent time period as possible, we obtained printouts available in the Central Statistical Office. Eventually these data will be published in official sources, but were not published at the time this study was written. Import data relating to imports for personal consumption, called "private imports," were taken from printouts of the Customs Administration. CSO printout data are subject to revision, but the revision is expected to be small. Unless otherwise specified, CSO printouts are our source. Recent changes in the classification of these data, has made them all publicly available.

AUTOS

There were 38,700 FSOs produced in 1988; 206,448 126ps; and 48,300 Polenezs for total domestic production of 293,448. The quantity of exports was 116,049, yielding 177,399 thousand autos produced for the domestic market. We take this latter number as Q in our model. There were 61.6 thousand imported autos in 1988, which is our value for q.

For the domestic free price of domestic autos P, we used the weekly magazine Zycie Gospodarcze. This weekly magazine publishes the prices of autos in the open air markets (although not all vehicles prices are published in every issue). We first took an average of the prices published there for the year for three vehicles: 126p, FSO (1300) and Polenez. This average was arrived at by first averaging the available published data for these vehicles within each month to obtain an observation for each vehicle for each month. Then the 12 monthly observations were averaged for each vehicle separately. These annual average prices were then weighted by the shares of these vehicles in total production, based on the data in the previous paragraph.

The controlled price of the Polonez in July 1988 was 2.5 million zloty; it was 1.9 million zloty for the FSO 1500. For the 126p we estimate the official price at .845 million zloty as an average of the prices between December 1987 and December 1988.[32] The weighted average price is 1.27 million zloty.

To obtain the relevant price of imports it is necessary to make a few adjustments. The value of imports are reported in official statistics at the official exchange rate. The average official exchange rate in 1988 was 434 zloty per dollar. Thus, the value of an imported $7,000 Toyota will be reported as $7,000*434 zloty. Imports generally must be paid for in dollars; thus it is the parallel market exchange rate that is relevant. The average parallel market exchange rate in 1988 was 1979 zloty per dollar, or 4.555 times the average official exchange rate.

The average unit value of an imported vehicle was .904 million zloty, which we multiply by 4.55 to obtain 4.12 million zloty as the average unit value at the parallel market exchange rate. Finally, we add 3 percent for transportation, and markups, yielding 4.24 million zloty for our estimate of p.

The tariff rate on CMEA imports is 0 (CMEA imports are about one-third of total imports), and on non-CMEA imports it is 3.7 percent.[33] Tariffs are paid in zloty on the imports valued at the official exchange rate. Thus, the average tariff rate is less than one percent when the imports are valued at the parallel market exchange rate.

COLOR TVs

The quantity of domestic production Q was 293,500 units; this was taken from Biuletyn Statystyczny No1/1989, a monthly bulletin of the CSO, but also checked with the CSO printouts. The quantity of imports was 156,136 units.

The average retail price P_c for a Polish TV was 394,000 zloty. The free market price was approximately twice the controlled price. The latter price is obtained through checking newspaper quotes and interviews.

Regarding the price of imports, these data are unavailable through official foreign trade aggregate statistics. Through interviews at the CSO, we found that the average price of all color TVs sold in Poland, both foreign and domestic, is 323,000 zloty, where the imports are valued at the official exchange rate. Then if A = the amount spent on all TVs, where the imports are valued at the official exchange rate, A = 323,000 zloty * 449,636. If B = the amount spent on domestic color TVs, B = 293,500 * 394,000 zloty. Then A - B is the amount spent on imported color TVs valued at the official exchange rate, and (A - B)/156,136 = the average price of an imported color TV valued at the official exchange rate. Following the discussion for autos, we must multiply this value by 4.55 to obtain the average price of imported TVs at the parallel market exchange rate, which is the relevant price for the consumer. This value is 863,867 zloty.

The tariff rate on imports from the West is 1.3 percent, and 0 on CMEA imports. The weighted average tariff rate is 1.1 percent, which yields 873,450 as the average tariff inclusive price of imports, p(1+t) in our equations.

APPENDIX C

THE LITERATURE ON ALLOCATION OF RATIONED GOODS AND RENT DISSIPATION

We note at the outset the distinction made by Browning (1974) between rent creation (which is the passage of a law that makes rent possible) and rent allocation, which is the division of the rent once created. Rents may be dissipated in the process of persuading the authorities to create the rent, or in allocating the rent. Bhagwati has made a similar distinction between DUP activities that are distortion seeking and distortion triggered. It is rent allocation (or distortion triggered activities) that is important in the context of the price controls in Poland, and it the focus of our analysis.

In panel A of figure 1, we have the graph of a market under price control. The price to the domestic consumer is not legally permitted to rise above A. At this price, firms are willing to supply the amount AB. For the quantity AB, the price D is the market clearing price, where the marginal valuation to consumers, D, exceeds the marginal costs to society of producing the product, A. Removing the price control will increase the quantity supplied and demanded until at E, the marginal valuation of consumers equals the marginal cost of producing the product. The area DCE represents the triangle of traditional "Harberger" distortion costs which are avoided by removing the price control.

Tullock (1967) noted that the rectangle ABCD may also represent a loss to society, so that the costs of the price control will exceed BCE. In particular, when the good is under price control, there is excess demand for the good at price A. and the allocation of a unit of the good conveys a rent to the recipient equal to D-A. Individuals may then expend resources in an effort to obtain the good. The expenditure of these resources in an effort to obtain the good will reduce the rent of the recipient, i.e., it will dissipate the rents. The classic way in which allocated rents from price control may be

dissipated was developed in a model by Barzel (1974). Individuals form a queue for the product. An individual who is deciding whether to join the queue, must assess the value of the rent received versus the opportunity cost of his time in the queue. The full price to the buyer is the money price of the good plus the opportunity cost of the buyer's time. Subject to an uncertainty premium, he will join the end of the queue, if the value of the rent exceeds the value of his time. Then the queue lengthens until the full price to the buyer (including the opportunity cost of time) exactly dissipates the rents. This implies that the full price to the consumer rises to D, which is higher than the market clearing price without a price control, and explains why queuing is a very inefficient method of allocating rationed goods.

Lindsay and Feigenbaum (1984) have developed another model in which allocated rents are completely dissipated, even when individuals do not waste time queuing for the good, but where goods are allocated according to waiting lists. The central assumption of their model is that they limit their discussion to products in which delay in the receipt of the product reduces its value. For example, receiving a vacation at a Black Sea resort, or obtaining an article of fashionable clothing will be reduced in value if received at a late or inopportune time. In such cases, there is a length of the waiting list beyond which one will not join, because at the time the consumer expects receipt of the product her valuation is reduced to the point where there is no rent.

The early literature on rent-seeking (for example, Tullock, 1967; Krueger, 1974; Posner, 1975) focused on cases in which rents are fully and exactly dissipated.[34] During the 1980s, however, a number of models were developed that showed conditions under which rent dissipation may exceed or

be less than actual rents. Deacon and Sonstelie (1989) modified the model of Barzel to allow for the possibility of various technologies that would reduce the cost of queuing, and showed that overdissipation of the rents will generally occur in these circumstances.[35]

There has been more discussion of the possibility of underdissipation of the rents. Hillman and Katz (1984) showed that in a Barzel type model with uncertainty of receipt of the rationed good, risk aversion would induce less than full rent dissipation. The risk aversion effect would be larger, the larger the costs of waiting in relation to the wealth of the individual.[36]

Flowers (1987) has noted various methods of avoiding rent dissipation in rent allocation schemes. Most notably, if the rationed good is auctioned, then the total costs of the price control is the Harberger triangle, except for minor administrative costs of the auction.[37] In addition, the allocation of rents by random methods will generally avoid the dissipation of rents.

Bhagwati and Srinivasan (1980) and Bhagwati (1980; 1982) have established the striking result that due to second best considerations, there are conditions under which DUP activities may be welfare improving. For example, consider an economy which produces two goods, goods 1 and 2, where a tariff of 50 percent is imposed on good 2. Consider two cases: (i) the tariff is imposed exogenously without any lobbying activity; and (ii) "tariff seekers" in industry 2 expend resources in lobbying activity that contracts the economy's production possibility frontier for the two goods, but ultimately achieves the same 50 percent tariff. The presumption of the rent-seeking literature was that case (ii) is welfare inferior to case (i) (see Tullock, 1981). Due to the tariff on good 2, however, in case (i) the economy

produces too much of good 2 and too little of good 1 for a social optimum. Anything that shifts resources toward the production of good 1 will be welfare improving, ceterus paribus. In particular, if lobbying shifts production toward good 1, there will be a welfare tradeoff between the loss of resources expended in lobbying, and the second best benefit of reducing the distortion of too little of good 1 being produced. In these conditions, Bhagwati shows that up to a certain amount of lobbying, lobbying is welfare superior to the imposition of the tariff exogenously.[38] Since DUP activities can be welfare improving, this led Bhagwati to emphasize the need for empirical estimates in specific situations.

In Eastern Europe another kind of second best situation has existed in which the allocation of goods at below market prices may be welfare enhancing. A low level of effort and efficiency is reported in many state owned factories and mines. Goods have been used as bonus payments to workers who are assessed to be the most productive. Competition for these goods among factory workers raises productivity and is socially productive, i.e., it reduces X-inefficiency. It seems inappropriate, however, to define the allocation of goods to the most productive workers as rent-seeking. Rather, it is equivalent to the government taxing the goods producing sector (by requiring delivery of the goods to the government at the controlled price and reselling them at the market clearing price), and using the taxes it receives to pay bonus payments to workers. Then the workers are merely receiving higher wages in accordance with the value of their marginal product; and since the bonus payments induces greater supply of effort, the payments are not rents.[39] Regardless of whether we call the payments to workers a bonus wage or a rent, the key point is that the Tullock rectangle is not dissipated rents in this instance. As

discussed in the text, there were also cases closer to classical socially wasted rent dissipation. Thus, the extent to which rent-seeking dissipates the allocation of rents in a socially wasteful manner depends very much on the method of allocation of the rents.

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ENDNOTES

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1. Another reason that the Polish official indices exaggerate the decline in the standard of living is that they ignore private output, which grew significantly in 1990.
2. The Czechoslovakian price decontrol, trade and exchange rate reforms came primarily in January 1991, whereas the analogous Hungarian reforms progressed gradually beginning in earnest in January 1989.
3. Although there is empirical work in socialist economies, it tends to focus on macroeconomic problems, or be based on highly aggregated data. There have been relatively few empirical analyses of individual markets. Exceptions include Kapitany, Kornai and Szabo (1984), Tarr (1990b) and Charemza, Gronicki and Quandt (1988). The latter study used queuing theory to explain the existence of positive excess demand in the Polish auto market, but did not estimate either the positive or normative effects of reducing price controls or import restraints, which is our focus. Deacon and Sonstelie (1985) and Alderman (1987), Lindsay and Feigenbaum (1984) and Sah (1987) are papers which have estimated rent seeking.

4. See Tarr (1990a), The World Bank (1990) or UNDP-World Bank (1989) for further details of the trade regime in Poland in 1989.

5. See Bhagwati (1978) for a survey and Tarr (1990a) for an empirical application to Poland.

6. Imports from Western countries are generally for hard currency sales.

7. Production of automobiles in Poland is done by two large state owned enterprises, based on Fiat engineering. A license to produce the Polski Fiat 125p was purchased from the Italian auto-maker Fiat in the mid-1960s. This vehicle is produced by the Polish company FSO, at its Warsaw factory, in two very similar versions now called the FSO 1300 and the FSO 1500. A license to produce the somewhat less expensive Polski Fiat 126p was purchased from Fiat in the early 1970s. The 126p is produced by the Polish company FSM. The most expensive Polish auto is the Polonez; it is produced by FSO, and was designed with the cooperation of Fiat.

8. 293,000 autos were produced, but 116,000 were exported; 103,000 of these were exported to non-CMEA countries.

9. Moreover, there is a state owned company, POLMOZBYT, and private individuals who advertise in newspapers that sell cars for individuals for a commission.

10. In addition, a small number of cars are allocated to the domestic market for sale for hard currency; the price charged for these vehicles is close to the free market price for domestic vehicles, but sufficiently high that few are sold.

11. These estimates are from Gazeta Bankowa No. 5, 1989, and are based on December 1988 data.

12. Another source of imports worth mentioning is the system of "private" imports of autos (and color TVs). Individuals can travel abroad and bring

back an auto or color TV. Although tariffs on imports through foreign trade organizations are very low (see the data appendix for the details), private imports are subject to a special customs duty. The duty was high enough in 1985 to severely retard private imports; but since it is a specific duty in zloty, the high rate of Polish inflation has made in relatively unimportant.

13. Previously, it would have been necessary for some individuals to purchase through the black market in order to satisfy their demands.

14. Osband (1989) argues that corruption in the awarding of goods under price controls in socialist economies will be efficiency enhancing because individuals will compete for the awards. This appears to be oversimplified, however, since as the examples of the text indicate, some awards will be for purely wasteful or socially counterproductive activities.

15. In fact, in an economy under generalized shortages, the excess demand for goods implies from Walras Law an excess supply of money. Then payment in kind will usually be a more effective method of inducing effort than cash payments.

16. Lindsay and Feigenbaum (1984) have shown that rent dissipation can occur with waiting lists even when there is no lobbying type activities. Their model requires that value of the product declines with delay of receipt, due to considerations such as style changes or time of year of receipt. Polish autos, whose style changed little from year to year, do not appear to fit into the category of products they analyzed.

17. Increased production of domestic vehicles and color televisions reduces the demand for the import substitute, but this has no effect on welfare

because there is no price change in the import market, i.e., no change in the distortion.

18. Since all autos produced under price control are consumed, there is no substitution effect for an increase in the domestic controlled price, subject to continued excess demand; but the increase in the controlled price leaves less income for the purchase of all other goods, including imported autos. Moreover, the domestic free market price does not affect import demand at all, because it simply determines rents among consumers of the fixed quantity of domestic autos, but does not affect the aggregate income available for the purchase of other goods by consumers in aggregate.

19. The policy is simulated by changing equation 4 in appendix A to u*p*(1+t), removing price controls, and finding the value of u that yields imports in the original equilibrium. The implicit subsidy is then 1-u.

20. In the initial equilibrium, the data indicate that free market autos sold for 2.8 times the controlled price, compared with a ratio of 2 for color TVs. Ceterus paribus, freeing the price of domestic autos should lead to a greater expansion of domestic production and a greater substitution for imported autos; this in turn requires a greater import subsidy to induce an increase in imports to their original level.

21. The parallel exchange rate, which was quite volatile, depreciated by about 1000 zloty per US dollar in April 1989. Exact estimation of a shadow exchange rate is, of course, problematical. The shadow exchange rate is clearly less than the parallel rate, however, and these estimates are illustrative of the impact of appreciating the parallel exchange rate toward the shadow exchange rate.

22. In fact, the devaluation of 1990 encouraged a massive export boom during

the first three quarters of 1990, until inflation (in significant part caused by the export boom with a fixed exchange rate) eliminated the highly favorable exchange rate for exporters. See the above cited macroeconomic papers on Poland, especially, Pinto, Coricelli and de la Calle.

23. Charemza et al. focused on an estimate of the amount of excess demand for autos. Based on our calibrated demand curve, it is straightforward to calculate that excess demand for autos is 317 thousand units initially, and is reduced to 232 thousand units after the lowering of the import price.

24. We discuss the model using autos as the example. The arguments also apply to color TVs unless otherwise stated.

25. This equation is analogous to equation 11 of Neary-Roberts (1980), except that their demand function for the unconstrained good is compensated (Hicksian).

26. Among the other factors affecting demand would be the supply of used autos, and the extent of their substitution with new autos.

27. Either profit maximization of cost plus markup pricing rules lead to an upsloping supply curve given increasing marginal costs.

28. In the case of color TVs, e = 1.65 is assumed, based on estimates from Shiells, Deardorff and Stern (1986). Then b = -.03.

29. In the case of color TVs, in the central elasticity case, we take the own price elasticities to be - .855, based on the estimates of Shiells, Deardorf and Stern (1986). We also use this source for the income elasticity, which is 1.65. The supply elasticity is taken to be .5 in the central elasticity case, and the cross elasticities, which are derived by

the procedures explained in the appendix are C = .4; b = -.004; and s = -1.32.

30. Charemza et al. prefer to characterize the situation as one of equilibrium with excess demand.

31. The data were collected by Bohdan Wyznikiewicz.

32. The December 1988 price was obtained from Gazeta Bankova, No. 5, 1989. The December 1987 price was obtained from the Statistical Yearbook of the Central Statistical Office, p.405.

33. This is the tariff rate when the auto is imported by official "Foreign Trade Organizations," (organizations licensed to import") of which there are now many who are in competition. An individual who wanted to import for his own use would pay a different tariff rate, which was currently approximately 5 percent in 1989. The tariff rate on "personal imports" was sufficiently different in 1986 and 1987 that personal imports were reduced by over 75 percent, while official imports increased. By 1989, inflation had eroded the personal import tariff rate, which is a specific tariff.

34. Rents from the granting of a monopoly license or quota may be dissipated by competition among potential recipients of the license. A strong version of this view is represented by McCormick, Shugart and Tollison (1984) who contend that the benefits of deregulation are quite small because rents have been dissipated and cannot be recouped. Their argument ignores continuing rent dissipation in the allocation rather than creation of rents, such as queuing.

Flowers (1987) has noted that if the benefits of creating the rent are not divisible among potential recipients, there is a free rider problem which

may result in less than all the created rents being dissipated. For example, if a tariff protects all members of a domestic industry, those who do not invest in political activity to obtain the tariff can free ride on those who do. As a result, less than the full amount of the industry rents from creation of the tariff will be invested in the activity of obtaining the tariff.

35. For example, consider price controls on gasoline, in which initially the wasted time in the queue exactly offsets the rents received on the gasoline. A price taking individual, who anticipates the persistence of the price controls, has an incentive to buy a second gas tank. Having purchased the second tank, the value of the rents received after waiting in the queue increase, so individuals with two tanks will be willing to wait in the queue longer than those with only one gas tank. Eventually, as all consumers buy second gas tanks, the queue lengthens until the rents are fully dissipated for individuals with two tanks. But then society has incurred the costs of equipping cars with two gas tanks, which is the overdissipation of the rent.

36. Tullock (1980) and Rogerson (1982) have characterized situations of under or over dissipation of the rents in a bidding model. Higgins, Shugart and Tollison (1985), however, show that in an extension of the model considered by Tullock, if entry is endogenous, rents are dissipated expectationally.

37. This method has been utilized in the allocation of import quotas, most notably in New Zealand.

38. Lobbying would induce a shift in production toward good 1 if lobbying activities intensively use the factor that is used intensively in good 2. Then lobbying will increase the price of that factor and the cost of

production of good 2 relative to good 1, which will induce a shift of resources toward good 1. Alternatively, lobbying could induce a shift in resources toward good 2 if lobbying intensively uses the factor used intensively in good 1. Then the additional second best distortion is added to the wasted resources of lobbying.

39. In fact, in an economy under generalized shortages, the excess demand for goods implies from Walras Law an excess supply of money. Then payment in kind will usually be a more effective method of inducing effort than cash payments.

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